

What is claimed is:

1. An attenuated *Shigella* strain wherein said *Shigella* is able to enter a cell and die once inside the cell.

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2. An attenuated *Shigella* strain according to claim 1, wherein said strain is *S. flexneri*.

3. The attenuated *Shigella* strain according to claim 2, wherein said strain is 15D given ATCC accession number ATCC 55710.

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4. A method for producing an attenuated *Shigella* strain, said method comprising inactivating an aspartate β -semialdehyde dehydrogenase gene present in said *Shigella*.

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5. A method for producing an attenuated *Shigella* strain according to claim 4 wherein said inactivation is by mutation.

6. A method for producing an attenuated *Shigella* strain according to claim 4 wherein said attenuated *Shigella* is able to enter a cell but dies once inside the cell.

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7. A vaccine for reducing in an individual disease symptoms caused by *Shigella*, said vaccine comprising:

- (i) attenuated *Shigella*; and
- (ii) a pharmaceutically acceptable excipient.

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8. A vaccine for reducing in an individual disease symptoms according to claim 7, wherein said *Shigella* is *S. flexneri*.

9. A vaccine for reducing in an individual disease symptoms caused by *S. flexneri* according to claim 8, wherein said attenuated *S. flexneri* is 15D given ATCC accession number ATCC 55710.

5 10. A vaccine for reducing in an individual disease symptoms caused by *Shigella* according to claim 7, wherein said attenuated *Shigella* is further inactivated.

11. A method for reducing in an individual disease symptoms caused by *Shigella* comprising administering to said individual attenuated *Shigella* in a pharmaceutically acceptable
10 excipient, in an immunologically effective dose.

12. A method for reducing in an individual disease symptoms caused by *Shigella* according to claim 11, wherein said *Shigella* is *S. flexneri*.

15 13. A method for reducing in an individual disease symptoms caused by *Shigella* according to claim 11, wherein said attenuated *Shigella* is further inactivated.

14. A delivery vehicle for the delivery of DNA to a cell, said vehicle comprising
20 attenuated *Shigella* wherein said DNA is introduced.

15. A delivery vehicle for the delivery of DNA to a cell according to claim 14, wherein
said *Shigella* is *S. flexneri*.

25 16. A delivery vehicle for the delivery of DNA to a cell according to claim 14, wherein
said cell is a cell of an intestinal mucosal epithelium cell.

17. A delivery vehicle for the delivery of DNA to a cell according to claim 14, wherein said *Shigella* is *S. flexneri*.

18. A delivery vehicle for the delivery of DNA to a cell according to claim 17, wherein
5 said *S. flexneri* is 15D given ATCC accession number ATCC 55710.

19. A delivery vehicle for the delivery of DNA to a cell according to claim 14, wherein said attenuated *Shigella* is further inactivated.

10 20. A delivery vehicle for the delivery of an antigen to a cell comprising attenuated *Shigella* into which said antigen is introduced.

21. A delivery vehicle for the delivery of an antigen to a cell according to claim 20, wherein said *Shigella* is *S. flexneri*.

15 22. A delivery vehicle for the delivery of an antigen to a cell according to claim 21, wherein said *S. flexneri* is 15D.

20 23. A delivery vehicle for the delivery of an antigen to a cell according to claim 20, wherein said attenuated *Shigella* is further inactivated.

24. A method for oral immunization of an individual against *Shigella* comprising orally administering to said individual an immunologically effective amount of attenuated *Shigella* in a pharmaceutically acceptable excipient.

25 25. A method for oral immunization of an individual against *Shigella* according to claim 24, wherein said *Shigella* is *S. flexneri*.

26. A method for oral immunization of an individual against *Shigella* according to claim 25, wherein said *S. flexneri* is 15D.

5 ~~27. A method for oral immunization of an individual against *Shigella* according to claim 24, wherein said attenuated *Shigella* is further inactivated.~~

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10 28. A method for delivering DNA to a cell, said method comprising:

- (i) introducing said DNA into attenuated *Shigella*; and
- (ii) administering said *Shigella* to said cell.

29. A method for delivering DNA to a cell according to claim 28, wherein said *Shigella* is *S. flexneri*.

15 30. A method for delivering DNA to a cell according to claim 29, wherein said *S. flexneri* is 15D.

20 31. A method for delivering DNA to a cell according to claim 28, wherein said cell is a cell of a mucosal epithelium.

32. A method for delivering DNA to a cell according to claim 31, wherein said mucosal epithelium is intestinal mucosal epithelium.

25 33. A method for delivering DNA to a cell according to claim 28, wherein said attenuated *Shigella* is further inactivated.

~~34. A method for delivering an antigen to a cell comprising:~~

- (i) introducing said antigen into an attenuated *Shigella*; and
- (ii) administering said *Shigella* to said cell.

35. A method for delivering an antigen to a cell according to claim 34, wherein said
5 *Shigella* is *S. flexneri*.

36. A method for delivering an antigen to a cell according to claim 35, wherein said *S. flexneri* is 15D given ATCC accession number ATCC 55710.

10 37. A method for delivering an antigen to a cell according to claim 34, wherein said cell is a cell of a mucosal epithelium.

38. A method for delivering an antigen to a cell according to claim 37, wherein said mucosal epithelium is intestinal mucosal epithelium.

15 39. A method for delivering an antigen to a cell according to claim 34, wherein said attenuated *Shigella* is further inactivated.

20 40. A method for detecting *Shigella* infection, said method comprising:
(i) coating a surface with attenuated *Shigella* or its components;
(ii) contacting said coated surface with serum or tissue sample from an individual suspected of having said infection, and
(iii) detecting the presence or absence of the infection by detecting the presence or absence of a complex formed between said *Shigella* and immune response specific therefor
25 present in said sample.

41. A diagnostic kit for the detection of *Shigella* infection, said kit comprising attenuated *Shigella*, and ancillary reagents suitable for use in detecting the presence of immune response to said *Shigella* in a sample.

5 42. A diagnostic kit for the detection of *Shigella* according to claim 41, wherein said *Shigella* is *S. flexneri*.

43. The diagnostic kit according to claim 42, wherein said *S. flexneri* is 15D given ATCC accession number ATCC 55710.

-10 44. A method for the delivery of functional nucleic acids into a cell using bacteria comprising:

- 15 (i) introducing said nucleic acids into an attenuated bacteria; and
(ii) administering said bacteria to said cell.

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